STATEMENT OF THE CLAIMS

1. (currently amended) A method, comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal by reducing and averaging differential quadrature components of the received signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein

said indication of said wireless telecommunications signal is a Fourier transformed indication (X_i, Y_i), and

said modifying an indication of said wireless telecommunications signal comprises correcting said Fourier transformed indication with estimates of a differential reference vector (dX_r, dY_r).

2. (canceled)

3. (canceled)

4. (canceled)

5. (currently amended) A method according to claim [[4]] 1, wherein:

said differential reference vector is obtained by calculating differences between said corrected Fourier transformed indications and closest constellation point values to provide differential quadrature components of the corrected received signal dX_i and dY_i, reducing said differential quadrature components to obtain reduced differential components dX_{ir} and dY_{ir} and averaging sequences of said reduced differential components to provide a current estimate of said differential reference vector.

6. (original) A method according to claim 5, wherein:

said reducing is accomplished according to

$$dX_{ir} = (A_0/a_i)(dX_i\cos\Delta_i - dY_i\sin\Delta_i),$$

$$dY_{ir} = (A_0/a_i)(dY_i\cos\Delta_i + dX_i\sin\Delta_i),$$

where dX_{ir} and dY_{ir} are reduced differential quadrature components, A_0 is an amplitude of a reference vector, a_i is an amplitude of an i'th decision vector, and Δ_i is a phase difference between an i'th decision vector and a reference vector.

7. (original) A method according to claim 6, wherein:

said averaging is accomplished according to

$$dX_r(i) = (1/N)\sum dX_{jr} = (A_0/N)^* \sum_{j=i-N}^{i} (dX_j\cos\Delta_j - dY_j\sin\Delta_j)/a_j,$$

$$dY_r(i) = (1/N)\sum dY_{jr} = (A_0/N)^* \sum_{j=i-N}^{i} (dY_j\cos\Delta_j + dX_j\sin\Delta_j)/a_j,$$

where $dX_r(i)$ and $dY_r(i)$ are averaged differential components at the i'th received symbol, and N is the number of symbols being averaged.

8. (original) A method according to claim 7, wherein:

said N symbols being averaged are a block of N symbols.

9. (original) A method according to claim 7, wherein:

said N symbols being averaged are a sliding window of N symbols.

10. (original) A method according to claim 7, wherein:

said N symbols include only symbols deemed reliable.

11. (original) A method according to claim 5, wherein:

said modifying is accomplished according to

$$X_{ic} = (1/A)\{[(A_0)^2 + dX_rX_0 + dY_rY_0]X_i - [dX_rY_0 - dY_rX_0]Y_i\}$$

$$Y_{ic} = (1/A)\{[(A_0)^2 + dX_rX_0 + dY_rY_0]Y_i + [dX_rY_0 - dY_rX_0]X_i\}$$

where X_0 and Y_0 represent coordinates of a reference vector, A_0 is an amplitude of said reference vector, and $A = A_0[(X_0+dX_r)^2 + (Y_0+dY_r)^2]^{0.5}$.

12. (original) A method according to claim 11, wherein:

said reference signal has coordinates X_0=1 and Y_0=0.

13. (canceled)

14. (currently amended) A method ~~according to claim 13, wherein:~~ comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal by reducing and averaging quadrature components of the received signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein

said indication of said wireless telecommunications signal is a Fourier transformed indication (X_i, Y_i), and

said modifying an indication of said wireless telecommunications signal comprises correcting said Fourier transformed indication with estimates of a reference vector (X_r, Y_r).

15. (previously presented) A method according to claim 14, wherein:

said reference vector is obtained by obtaining quadrature components of the corrected received signal X_i and Y_i, reducing said quadrature components to obtain reduced components X_{ir} and Y_{ir}, and averaging sequences of said reduced components to provide a current estimate of said reference vector.

16. (original) A method according to claim 15, wherein:

said reducing is accomplished according to

$X_{ir} = (A_0/a_i)(X_i\cos\Delta_i - Y_i\sin\Delta_i)$,

$Y_{ir} = (A_0/a_i)(Y_i\cos\Delta_i + X_i\sin\Delta_i)$,

where X_{ir} and Y_{ir} are reduced quadrature components, A_0 is an amplitude of a reference vector, a_i is an amplitude of an i'th decision vector, and Δ_i is a phase difference between an i'th decision vector and a reference vector.

17. (original) A method according to claim 16, wherein:

said averaging is accomplished according to

$$X_r(i) = (1/N)\sum X_{jr} = (A_0/N)^* \sum_{j=i-N}^{i} (X_j\cos\Delta_j - Y_j\sin\Delta_j)/a_j,$$

$$Y_r(i) = (1/N)\sum Y_{jr} = (A_0/N)^* \sum_{j=i-N}^{i} (Y_j\cos\Delta_j + X_j\sin\Delta_j)/a_j,$$

where $X_r(i)$ and $Y_r(i)$ are averaged components at the i'th received symbol, N is the number of symbols being averaged.

18. (original) A method according to claim 15, wherein:

said modifying is accomplished according to

$X_{ic} = (1/A)\{[(A_0)^2 + dX_rX_0 + dY_rY_0]X_i - [dX_rY_0 - dY_rX_0]Y_i\}$,

$Y_{ic} = (1/A)\{[(A_0)^2 + dX_rX_0 + dY_rY_0]Y_i + [dX_rY_0 - dY_rX_0]X_i\}$,

where X_0 and Y_0 represent coordinates of a reference vector, A_0 is an amplitude of said reference vector, and $A = A_0[(X_r)^2 + (Y_r)^2]^{0.5}$.

19. (original) A method according to claim 18, wherein:

said reference signal has coordinates X_0=1 and Y_0=0.

20. (currently amended) A method ~~according to claim 3, wherein:~~ comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal by reducing and averaging differential quadrature components of the received signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein

said indication of said wireless telecommunications signal is a Fourier transformed indication (X_i, Y_i), and

said modifying constellation point values comprises generating corrected coordinates of the constellation points X_{cn} and Y_{cn}.

21. (previously presented) A method according to claim 20, wherein:

said corrected coordinates are obtained by obtaining differences between said received signal and said corrected coordinates to provide differential quadrature components dX_i and dY_i, reducing said differential quadrature components to obtained reduced differential components dX_{ir} and dY_{ir}, averaging sequences of said reduced differential components to provide current estimates of a differential reference vector (dX_r, dY_r), and using said current estimates of said differential reference vector to obtain corrected coordinates X_{cn} and Y_{cn}, where n=1,2, …, m, and where m represents the number of constellation points.

22. (original) A method according to claim 21, wherein:

said reducing is accomplished according to

$dX_{ir} = (A_0/a_i)(dX_i\cos\Delta_i - dY_i\sin\Delta_i)$,

$dY_{ir} = (A_0/a_i)(dY_i\cos\Delta_i + dX_i\sin\Delta_i)$,

where dX_{ir} and dY_{ir} are reduced differential quadrature components, A_0 is an amplitude of a reference vector, a_i is an amplitude of an i'th decision vector, and Δ_i is a phase difference between an i'th decision vector and a reference vector.

23. (original) A method according to claim 22, wherein:

said averaging is accomplished according to

$$dX_r(i) = (1/N)\sum dX_{jr} = (A_0/N)^* \sum_{j=i-N}^{i} (dX_j\cos\Delta_j - dY_j\sin\Delta_j)/a_j,$$

$$dY_r(i) = (1/N)\sum dY_{jr} = (A_0/N)^* \sum_{j=i-N}^{i} (dY_j\cos\Delta_j + dX_j\sin\Delta_j)/a_j,$$

where $dX_r(i)$ and $dY_r(i)$ are averaged differential components at the i'th received symbol, and N is the number of symbols being averaged.

24. (original) A method according to claim 23, wherein:

said N symbols being averaged are a block of N symbols.

25. (original) A method according to claim 23, wherein:

said N symbols being averaged are a sliding window of N symbols.

26. (original) A method according to claim 23, wherein:

said N symbols include only symbols deemed reliable.

27. (original) A method according to claim 21, wherein:

said modifying is accomplished according to

$X_{cn}(i) = X_{cn}(i-1) + (A_n/A_0)[dX_r(i)\cos\theta_n - dY_r(i)\sin\theta_n]$,

$Y_{cn}(i) = Y_{cn}(i-1) + (A_n/A_0)[dY_r(i)\cos\theta_n + dX_r(i)\sin\theta_n]$

where A_n is an amplitude of the n'th constellation point, A_0 is an amplitude of a reference vector, and θ_n is a phase difference between the reference vector and the n'th constellation point.

28. (original) A method according to claim 20, wherein:

said corrected coordinates are obtained by reducing said X_i, Y_i to obtain reduced components X_{ir} and Y_{ir}, averaging sequences of said reduced components to provide current estimates of a reference vector (X_r, Y_r), and using said current estimates of said reference vector to obtain corrected coordinates X_{cn} and Y_{cn}, where n=1,2, …, m, and where m represents the number of constellation points.

29. (original) A method according to claim 28, wherein:

said reducing is accomplished according to

$X_{ir} = (A_0/a_i)(X_i\cos\Delta_i - Y_i\sin\Delta_i)$,

$Y_{ir} = (A_0/a_i)(Y_i\cos\Delta_i + X_i\sin\Delta_i)$,

where X_{ir} and Y_{ir} are reduced quadrature components, A_0 is an amplitude of a reference vector, a_i is an amplitude of an i'th decision vector, and Δ_i is a phase difference between an i'th decision vector and a reference vector.

30. (original) A method according to claim 29, wherein:

said averaging is accomplished according to

$$X_r(i) = (1/N)\sum X_{jr} = (A_0/N)^* \sum_{j=i-N}^{i} (X_j\cos\Delta_j - Y_j\sin\Delta_j)/a_j,$$

$$Y_r(i) = (1/N)\sum Y_{jr} = (A_0/N)^* \sum_{j=i-N}^{i} (Y_j\cos\Delta_j + X_j\sin\Delta_j)/a_j,$$

where $X_r(i)$ and $Y_r(i)$ are averaged components at the i'th received symbol, N is the number of symbols being averaged.

31. (currently amended) A method ~~according to claim 3, wherein:~~ comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal by reducing and averaging differential quadrature components of the received signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein

said wireless telecommunications signal is a multicarrier signal with correlated phase shifts,

said indication of said wireless telecommunications signal is a Fourier transformed multicarrier indication (X_k, Y_k), where k is a carrier index $k=1,\ldots N$ where N is the number of carriers in said multicarrier signal, and

said modifying an indication of said wireless telecommunications signal comprises correcting said Fourier transformed multicarrier indication with estimates of a differential reference vector (dX_r, dY_r).

32. (previously presented) A method according to claim 31, wherein:

said differential reference vector is obtained by calculating differences between said corrected Fourier transformed multicarrier indications and closest constellation point values to provide differential quadrature components of the corrected received signal dX_k and dY_k, reducing said differential quadrature components to obtain reduced differential components dX_{kr} and dY_{kr}, and averaging sets of said reduced differential components to provide a current estimate of said differential reference vector.

33. (original) A method according to claim 32, wherein:

said reducing is accomplished according to

$dX_{kr} = (A_0/a_k)(dX_k\cos\Delta_k - dY_k\sin\Delta_k)$,

$dY_{kr} = (A_0/a_k)(dY_k\cos\Delta_k + dX_k\sin\Delta_k)$

where dX_{ir} and dY_{ir} are sets of reduced differential quadrature components, Δ_k is the phase difference between decision and reference vectors at the k-th carrier, a_k is the amplitude of the decision vector at the k-th carrier, and A_0 is the amplitude of the reference vector.

34. (original) A method according to claim 33, wherein:

said averaging is accomplished according to

$$dX_r = (1/K)\sum dX_{kr} = (A_0/K)\sum_{k=1}^{K} (dX_k\cos\Delta_k - dY_k\sin\Delta_k)/a_k,$$

$$dY_r = (1/K)\sum dY_{kr} = (A_0/K)\sum_{k=1}^{K} (dY_k\cos\Delta_k + dX_k\sin\Delta_k)/a_k,$$

where K is the number of of said multicarrier signal, and where dX_r and dY_r are averaged differential components.

35. (original) A method according to claim 31, wherein:

said modifying is accomplished according to

$X_{kc}= (1/A)\{[(A_0)^2 + dX_rX_0 + dY_rY_0]X_k - [dX_rY_0 - dY_rX_0]Y_k\}$,

$Y_{kc}= (1/A)\{[(A_0)^2 + dX_rX_0 + dY_rY_0]Y_k + [dX_rY_0 - dY_rX_0]X_k\}$,

where X_{kc}, Y_{kc} are the corrected quadrature components of the k-th carrier, X_k, Y_k are the received quadrature components of the k-th carrier, X_0 and Y_0 represent coordinates of a reference vector, A_0 is an amplitude of said reference vector, and $A = A_0[(X_0+dX_r)^2 + (Y_0+dY_r)^2]^{0.5}$, where dX_r and dY_r are the estimates of differential components of the reference vector.

36. (currently amended) A method ~~according to claim 3, wherein:~~ comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal by reducing and averaging differential quadrature components of the received signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein

said wireless telecommunications signal is a multicarrier signal with correlated phase shifts,

said indication of said wireless telecommunications signal is a Fourier transformed multicarrier indication (X_k, Y_k) where k is a carrier index, k=1,…K where K is the number of carriers in said multicarrier signal, and

said modifying an indication of said wireless telecommunications signal comprises correcting said Fourier transformed multicarrier indication with estimates of a reference vector (X_r, Y_r).

37. (previously presented) A method according to claim 36, wherein:

said reference vector is obtained by reducing a set of components X_k and Y_k to obtain reduced components X_{kr} and Y_{kr}, and averaging set of said reduced components to provide a current estimate of said reference vector.

38. (original) A method according to claim 37, wherein:

said reducing is accomplished according to

$$X_{kr} = (A_0/a_k)(X_k\cos\Delta_k - Y_k\sin\Delta_k),$$

$$Y_{kr} = (A_0/a_k)(Y_k\cos\Delta_k + X_k\sin\Delta_k),$$

where A_0 is an amplitude of said reference vector, a_k is an amplitude of a decision vector for the k'th carrier of said multicarrier signal, and Δ_k is a phase difference between said decision vector for the k'th carrier and said reference vector.

39. (original) A method according to claim 38, wherein:

said averaging is accomplished according to

$$X_r = (1/K)\sum X_{kr} = (A_0/K)\sum_{k=1}^{K} (X_k\cos\Delta_k - Y_k\sin\Delta_k)/a_k,$$

$$Y_r = (1/K)\sum Y_{kr} = (A_0/K)\sum_{k=1}^{K} (Y_k\cos\Delta_k + X_k\sin\Delta_k)/a_k.$$

40. (original) A method according to claim 36, wherein:

said modifying is accomplished according to

$X_{kc} = (1/A)[X_k(X_rX_0 + Y_rY_0) - Y_k(X_rY_0 - Y_rX_0)]$,

$Y_{kc} = (1/A)[Y_k(X_rX_0 + Y_rY_0) + X_k(X_rY_0 - Y_rX_0)]$,

where X_{kc}, Y_{kc} are the corrected quadrature components of the k-th carrier, X_k, Y_k are the received quadrature components of the k-th carrier, X_0 and Y_0 represent coordinates of a reference vector, A_0 is an amplitude of said reference vector, and $A = A_0[(X_0)^2 + (Y_0)^2]^{0.5}$.

41. (currently amended) A telecommunications apparatus, comprising:

a receiver which receives a wireless telecommunications data signal without accompanying pilot signals, said receiver including a demapper, said demapper including means for extracting phase adjustment information from the telecommunications data signal by reducing and averaging differential quadrature components of the received signal and for using said phase adjustment information to demap said wireless telecommunications data signal by either modifying ~~an indication~~ a Fourier transformed indication (X_i, Y_i) of said telecommunications data signal by correcting said Fourier transformed indication with estimates of a differential reference vector (dX_r, dY_r) and comparing a so-modified indication to constellation point values to obtain a decision, or by modifying constellation point values and comparing ~~an indication~~ a Fourier transformed indication (X_i, Y_i) of said wireless telecommunications data signal to the modified constellation point values to obtain a decision.

42. (currently amended) A telecommunications system, comprising:

a first telecommunications apparatus including a transmitter which transmits a wireless telecommunications data signal without accompanying pilot signals; and

a second telecommunications apparatus including a receiver which receives said wireless telecommunications data signal, said receiver including a demapper, said demapper including means for extracting phase adjustment information from the telecommunications data signal by reducing and averaging differential quadrature components of the received signal and for using said phase adjustment information to demap said wireless telecommunications data signal by either modifying ~~an indication~~ a Fourier transformed indication (X_i, Y_i) of said telecommunications data signal by correcting said Fourier transformed indication with estimates of a differential reference vector (dX_r, dY_r) and comparing a so-modified indication to constellation point values to obtain a decision, or by modifying constellation point values and comparing ~~an indication~~ a Fourier transformed indication (X_i, Y_i) of said wireless telecommunications data signal to the modified constellation point values to obtain a decision.

43. (currently amended) A method ~~according to claim 3, wherein:~~ comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal by reducing and averaging differential quadrature components of the received signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein,

said wireless telecommunications signal is a multicarrier signal with correlated phase shifts,

said indication of said wireless telecommunications signal is a Fourier transformed multicarrier indication (X_k, Y_k) where k is a carrier index, k=1,…K where K is the number of carriers in said multicarrier signal, and

said modifying constellation point values comprises generating corrected coordinates of the constellation points X_{cn} and Y_{cn}.

44. (previously presented) A method according to claim 43, wherein:

said corrected coordinates are obtained by obtaining differences between said received signal and said corrected coordinates to provide differential quadrature components dX_k and dY_k, reducing said differential quadrature components to obtain reduced differential components dX_{kr} and dY_{kr}, averaging sequences of said reduced differential components to provide current estimates of a differential reference vector (dX_r, dY_r), and using said current estimates of said differential reference vector to obtain corrected coordinates X_{cn} and Y_{cn}, where n=1,2, …, m, and where m represents the number of constellation points.

45. (previously presented) A method according to claim 44, wherein:

said reducing is accomplished according to

$dX_{kr} = (A_0/a_k)(dX_k\cos\Delta_k - dY_k\sin\Delta_k)$,

$dY_{kr} = (A_0/a_k)(dY_k\cos\Delta_k + dX_k\sin\Delta_k)$,

where dX_{kr} and dY_{kr} are reduced differential quadrature components, A_0 is an amplitude of a reference vector, a_k is an amplitude of an k'th decision vector, and Δ_k is a phase difference between a k'th decision vector and a reference vector.

46. (previously presented) A method according to claim 45, wherein:

said averaging is accomplished according to

$$dX_r = (1/K)\sum\ dX_{kr} = (A_0/K) \sum_{j=i-K}^{i} (dX_j\cos\Delta_j - dY_j\sin\Delta_j)/a_j,$$

$$dY_r = (1/K)\sum\ dY_{kr} = (A_0/K) \sum_{j=i-K}^{i} (dY_j\cos\Delta_j + dX_j\sin\Delta_j)/a_{k\backslash j},$$

where dX_r and dY_r are averaged differential components for all carriers of said multicarrier signal , and K is the number of said carriers.

47. (previously presented) A method according to claim 44, wherein:

said modifying is accomplished according to

$X_{cn} = X_n + (A_n/A_0)[dX_r\cos\theta_n - dY_r\sin\theta_n]$,

$Y_{cn} = Y_n + (A_n/A_0)[dY_r\cos\theta_n + dX_r\sin\theta_n]$

where A_n is an amplitude of the n'th constellation point, A_0 is an amplitude of a reference vector, and θ_n is a phase difference between the reference vector and the n'th constellation point.

48. (previously presented) A method according to claim 43, wherein:

said corrected coordinates are obtained by reducing said X_k, Y_k to obtain reduced components X_{kr} and Y_{kr}, averaging sequences of said reduced components to provide current estimates of a reference vector (X_r, Y_r), and using said current estimates of said reference vector to obtain corrected coordinates X_{cn} and Y_{cn}, where n=1,2, …, m, and where m represents the number of constellation points.

49. (previously presented) A method according to claim 48, wherein:

said reducing is accomplished according to

$X_{kr} = (A_0/a_k)(X_k\cos\Delta_k - Y_k\sin\Delta_k)$,

$Y_{kr} = (A_0/a_k)(Y_k\cos\Delta_k + X_k\sin\Delta_k)$,

where X_{kr} and Y_{kr} are reduced quadrature components, A_0 is an amplitude of a reference vector, a_k is an amplitude of an k'th decision vector, and Δ_k is a phase difference between a k'th decision vector and a reference vector.

50. (previously presented) A method according to claim 49, wherein:

said averaging is accomplished according to

$$X_r = (1/K)\sum X_{jr} = (A_0/K)\sum_{j=i-K}^{i} (X_j\cos\Delta_j - Y_j\sin\Delta_j)/a_j,$$

$$Y_r = (1/K)\sum Y_{jr} = (A_0/K)\sum_{j=i-K}^{i} (Y_j\cos\Delta_j + X_j\sin\Delta_j)/a_j,$$

where X_r and Y_r are averaged components, and K is the number of carriers of said multicarrier signal.

51. (currently amended) A method ~~according to claim 2, wherein:~~ comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal by reducing and averaging differential quadrature components or quadrature components of the received signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision, or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein

~~said extracting information comprises reducing and averaging differential quadrature components or quadrature components of the received signal,~~

said wireless telecommunications signal is a multicarrier signal with correlated phase shifts,

said indication of said wireless telecommunications signal is a Fourier transformed multicarrier Y-coordinate indication (Y_k), where k is a carrier index k=1,…K where K is the number of carriers in said multicarrier signal, and

said modifying an indication of said wireless telecommunications signal comprises correcting said Fourier transformed multicarrier Y-coordinate indication with estimates of either a reference Y-coordinate (Y_r) or a differential reference Y-coordinate (dY_r).

52. (previously presented) A method according to claim 51, wherein:

said differential reference Y-coordinate is obtained by calculating differences between said corrected Fourier transformed multicarrier Y-coordinate indications and closest constellation point values to provide differential quadrature components dX_k and dY_k, reducing said differential quadrature components to obtain reduced differential components dY_{kr}, and averaging said reduced differential components to provide a current estimate of said differential reference Y-coordinate.

53. (previously presented) A method according to claim 52, wherein:

said reducing is accomplished according to

$$dY_{kr} = (1/a_k)(dY_k\cos\Delta_k + dX_k\sin\Delta_k)$$

where dY_{kr} are reduced differential components, Δ_k is the phase difference between decision and reference vectors at the k-th carrier, and a_k is the amplitude of the decision vector at the k-th carrier.

54. (previously presented) A method according to claim 53, wherein:

said averaging is accomplished according to

$$dY_r = (1/K)\sum dY_{kr} = (A_0/K)\sum_{k=1}^{K} (dY_k\cos\Delta_k + dX_k\sin\Delta_k)/a_k,$$

where K is the number of carriers of said multicarrier signal, where dY_r is said differential reference Y-coordinate, and where A_0 is the amplitude of the reference vector.

55. (previously presented) A method according to claim 51, wherein:

said reference Y-coordinate is obtained by reducing a set of components X_k, Y_k to obtain reduced components Y_{kr}, and averaging said set of said reduced components to provide a current estimate of said reference Y-coordinate.

56. (previously presented) A method according to claim 55, wherein:

said reducing is accomplished according to

$$Y_{kr} = (1/a_k)(Y_k \cos\Delta_k + X_k \sin\Delta_k),$$

where a_k is an amplitude of a decision vector for the k'th carrier of said multicarrier signal, and Δ_k is a phase difference between said decision vector for the k'th carrier and said reference vector.

57. (previously presented) A method according to claim 56, wherein:

said averaging is accomplished according to

$Y_r = (1/K)\sum Y_{kr} = (A_0 /K)\sum_{k=1}^{K} (Y_k \cos\Delta_k + X_k \sin\Delta_k)/a_k$, where A_0 is the amplitude of the reference vector.

58. (currently amended) A method ~~according to claim 2, wherein:~~ comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein

said wireless telecommunications signal is a multicarrier signal with correlated phase shifts,

received carriers of said multicarrier signal are phase corrected by predetermined values of dY_r or Y_r radians to obtain a set of corrected carriers,

the set of corrected carriers is used for making multicarrier current decisions,

differential quadrature components of the corrected carriers are calculated using the current decisions,

the set of differential quadrature components or the quadrature components of the carriers are reduced and their Y-components are averaged, and

the average values are used as the predetermined values in phase correcting the received carrier values of a next multicarrier signal.

59. (currently amended) A method ~~according to claim 2, wherein:~~ comprising:

a) receiving a wireless telecommunications data signal without accompanying pilot signals;

b) extracting phase adjustment information from the wireless telecommunications data signal; and

c) using said phase adjustment information, demapping said wireless telecommunications data signal by either modifying an indication of said wireless telecommunications data signal and comparing a modified indication to constellation point values to obtain a decision or by modifying constellation point values and comparing an indication of said wireless telecommunications data signal to the modified constellation point values to obtain a decision, wherein

said wireless telecommunications signal is a multicarrier signal,

said modifying comprises correcting all received carriers of said multicarrier signal with some predetermined phase shift or with a constant phase increment, and with some predetermined sign to provide a set of corrected carriers to provide said modified indication X_k, Y_k,

said comparing comprises using said set of corrected carriers for making multicarrier current decisions, said multicarrier current decisions being used to determine differential quadrature components of the carriers, dX_k, dY_k, and

said demapping further comprises reducing said set of differential quadrature components or said modified indication, and applying a majority vote algorithm to the reduced set of differential quadrature components or said reduced set of modified

indications, and based at least partially on said majority vote algorithm, determining said phase adjustment information.

60. (previously presented) A method according to claim 59, wherein:

said majority vote algorithm transforms said reduced set of differential quadrature components or said reduced set of modified indications into an integer, and

said determining said phase adjustment information comprises comparing said integer to a predetermined threshold.

61. (previously presented) A method according to claim 60, wherein:

said determining said phase adjustment information further comprises making no phase correction if said integer relates to said predetermined threshold in a first manner, and determining a direction of phase correction if said integer relates to said predetermined threshold in a second manner.

62. (previously presented) A method according to claim 61, wherein:

said determining said phase adjustment information further comprises, assigning a phase shift value equal to an average phase shift of majority carriers if said integer relates to said predetermined threshold in said second manner.

63. (previously presented) A method according to claim 61, wherein:

said determining said phase adjustment information further comprises, assigning a phase shift value equal to a predetermined constant increment if said integer relates to said predetermined threshold in said second manner.

64. (previously presented) A method according to claim 59, wherein:

said majority vote algorithm comprises

$$D_{+-} = \sum_{k=1}^{K} \text{Sign}\ (dY_k \cos\Delta_k + dX_k \sin\Delta_k) \text{ or}$$

$$D_{+-} = \sum_{k=1}^{K} \text{Sign}\ (Y_k \cos\Delta_k + X_k \sin\Delta_k)$$

where K is the number of carriers of said multicarrier signal, Δ_k is a phase difference between a decision vector for the k'th carrier and a reference vector.